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Infection of the Bovine Udder by Pasteurella septica

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British veterinary literature contains only one record (Lovell, 1939) of pasteurellar infection of the bovine udder. It concerned an aged cow which contracted mastitis seven days after calving, followed by three days of mild systemic illness that terminated fatally. A limited autopsy revealed congestion of the lungs, fibrinous pleurisy and excess of peritoneal fluid. *Past. septica* was isolated from the mammary secretion drawn on the second day of illness. This was the only case, on a farm that had not any history of previous similar cases, and the mastitis was regarded as part of a generalised pasteurellar infection.

In the present case, six cows were consigned by rail to a station 50 miles distant. They arrived at that destination three days later after a journey of almost 200 miles. Clinical examination revealed that one cow, which was off food, had a temperature of 103° F., together with hot, painful swelling of one quarter of the udder, from which was obtained a straw-coloured fluid, some 50 ml. of which were submitted for bacteriological examination. At this stage, clinical observation of the case ceased.

Physical Characters of the Secretion.—The *p*H, estimated by means of Bayer indicator papers, was 8·0. The odour was fairly normal, but the fluid was of serous character and contained cream coloured clots. Centrifugation at 2,500 r.p.m. for five minutes, yielded a straw-coloured and slightly opaque supernatant fluid (60 per cent.) below which was a creamy, semi-solid layer (15 per cent.) separated from white sediment (25 per cent.) by a thin red layer, presumably of red blood corpuscles. (The percentages refer to the total volume of fluid in the graduated centrifuge-tube.) In place of the usual superficial layer of fat, there was a thin, powdery pellicle that subsequent microscopical examination showed to consist of fine flakes of fibrin.

Microscopical Examination.—Films of uncentrifuged secretion, stained by Gram, contained numerous, Gram-negative cocco-bacilli, occurring singly or in small clumps. Bipolar staining was a prominent feature, particularly in a film stained by Loeffler's methylene blue. Polymorphonuclear leucocytes and monocytes, in approximately equal proportions, were numerous and there were also a few large cells of the epithelioid type.

Cultural Characters.—One loopful of uncentrifuged fluid was sown on horse-blood agar and MacConkey plates, and incubated aerobically, at 37° C. for 24 hours, with the following results :—

Blood agar plate : pure growth of small, round, greyish, colonies, 1 mm. in diameter, with smooth moist surface ; amorphous structure and entire edge. The blood was unchanged.

MacConkey plate : no growth.

Except where stated, subcultures were incubated aerobically at 37° C.

Serum agar slope, 24 hours : moderate growth of small, discrete, greyish, low convex colonies.

Serum broth, 24 hours : diffuse, fairly heavy, turbidity : no surface pellicle. After seven days : moderate deposit that was viscid and did not disintegrate on shaking.

The basal media used were infusion broth and infusion agar (Wright, 1933).

The broth cultures were not motile at either 37° C., or 22° C.

Acid only was produced in dextrose, galactose, saccharose, maltose, mannose, mannitol and sorbitol. Rhamnose, lactose, trehalose, raffinose, starch, inulin, dextrin, adonitol, dulcitol, salicin and inosite were not changed. These carbohydrates were contained in peptone-water (Bacto-peptone), at *p*H 7·4 with phenol red as indicator and the reactions were read at 48 hours and at the end of three, four and seven days.

Indole and H_2S were produced and nitrates were reduced. Litmus milk and methylene blue milk were not changed nor was ammonia produced. The V.P. and M.R. tests were negative.

Experimental Pathogenicity.—0·5 ml. of a 24 hours whole broth culture, given subcutaneously, killed a mouse in 16 hours. The same culture was adjusted to correspond with tube 4 of Brown's scale, diluted to 10^{-6} and 0·5 ml. (equivalent to about 1,500 organisms) was inoculated subcutaneously into another mouse. Death ensued in 24 hours. In both cases, the main autopsical features were pneumonia, enlarged spleen, and petechiae of the serosae.

A rabbit, of 1,250 grammes weight, was given 0·1 ml. of whole broth culture by intranasal instillation. Health was maintained for the initial 24 hours, but death supervened in 40 hours and the *post-mortem* features comprised pneumonia and laryngo-tracheitis, the trachea being filled with creamy and somewhat frothy fluid.

Gram-negative, ovoid, small bacilli were demonstrated in the heart's blood of all three experimental animals and the bipolar character of their staining was particularly clear with methylene blue. From the same sources *Pasteurellae* were recovered.

It is not without significance that the preceding biological work was done with the seventh generation of the organism in artificial culture.

Serology.—From the Institute of Animal Pathology, Cambridge, two *Pasteurella* agglutinating sera were obtained. One serum had been prepared against Lovell's strain and had a homologous titre of 1 : 80. With it, a titre of 1 : 10,240 was obtained. The other antiserum, prepared against a *Pasteurella* isolated from calf lung, and of homologous titre of 1 : 2,560, agglutinated the strain under discussion to only 1 : 320.

Antigen consisted of a suspension, in 0·5 per cent saline, of a 24 hours serum agar culture. The suspension was adjusted to tube 4 of Brown's scale, killed by heat, and preserved with formol. The tests were carried out in 3 in. × ¾ in. tubes and read after 24 hours at 37° C. in an anhydric incubator and one hour at room temperature.

DISCUSSION

Topley and Wilson (1936) have declared : " Between the haemorrhagic septicaemia strains of different animal origin, there appears to be no constant characteristic of diagnostic value. Most workers therefore agree that these bacilli form a single group, though it appears possible, using a careful technique, to make out serological differences between them. At present each member is given a specific name ; probably it would be better to call them all one specific name, such as *Pasteurella septica* and to indicate the animal origin where necessary." Thus it was that *Past. septica* was selected for inclusion in the title of this communication.

References in literature to pasteurellar mastitis of cows are strangely few. Schlotthauer and Hardenbergh (1926) described a solitary case on a farm " where there had never been any haemorrhagic septicaemia infection so far as was known." A Holstein cow, aged five years and suckling a week-old calf, was attacked in one quarter of the udder. There was minimal disturbance of general health but four months later the quarter, long since free from pasteurellar infection, had not regained full function. The calf was unaffected. Klimmer (1930) mentioned *Pasteurella* as one of the occasional causes of bovine mastitis and referred to the experiences of Schlotthauer and Hardenbergh (*supra*), Poels, and Stazzi. Lovell (1939) had a single, but fatal, case in a Friesian-Shorthorn cow, aged 16 years, and again there was an association with very recent calving. An individual case was recorded by Viera and Castelo (1939) who reported that the cow died several days later, but whether from pasteurellosis or not was not determined. Lesbouyries *et al.* (1938) encountered nine cases in a herd of 12 cows, all of which latter had suffered mildly from foot-and-mouth disease 14 to 21 days previously. It was postulated that saprophytic *Pasteurellae* had become established in the udder in consequence of lowered resistance from prolonged decubitus, as well as from the attack of foot-and-mouth disease.

The present case does not appear to possess unusual features. It may have been an isolated one and it was obviously related to the fatigue, or other disturbance, which is commonly associated with sustained travelling. Unfortunately, the subsequent history of none of the animals could be followed The principal purpose of this communication, however, is to record, for the first time in Scotland, it is believed, the isolation from a bovine source of an organism which belongs to the *Pasteurella* group of pathogens.

SUMMARY

From the mammary secretion of a cow there was isolated a bipolar bacillus which was designated *Past. septica* since it produced indole, fermented sorbitol, was not haemolytic but was highly virulent for the rabbit.

(*Concluded at foot of col.* 1, *page* 388)

CLINICAL COMMUNICATION

Kidney Lesions in a Sow : An Aetiological Query

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Subject.—Sow of large white type ; age and previous history unknown. Bought as in pig but stage of pregnancy not known.

History.—During visits to the owner's premises I had seen this sow on several occasions over a period of six weeks before death ; she had always appeared healthy and in exceptionally good condition, having regard to present feeding difficulties. She and another in-pig sow were kept in large converted dog kennels with free access to a fairly large yard ; both were fed entirely on swill.

On July 27th the sow farrowed 15 pigs, two of which she lay on, the remaining 13 being alive and healthy at the time of her death. On August 6th she was thought to be slightly less keen for her food, but was otherwise normal. At about 6 p.m. the same day she was found dead.

Post-mortem Examination.—This was performed about three hours later. The sow was lying on her left side, the only external feature of note being the waxy and pallid appearance of the mammary glands.

Thorax : heart normal ; very little blood in its cavities or in the great vessels. Very slight hypostatic congestion of the left lung.

Abdomen : liver very pale. Stomach and intestinal tract normal.

Kidneys : right kidney normal. The left kidney was represented by a thick fibrous capsule, approximately six times the normal size, which was produced into a funnel-like entrance to the ureter. This capsule contained extremely large quantities of recent blood clot and it was obvious that death was due to internal haemorrhage into the left renal capsule. A careful search did not reveal anything approximating kidney tissue, in fact the only substances detected other than blood and blood clot were a few strands of friable connective tissue and a few small pieces of fat.

The only conclusion I could reach was that there was some long-standing cystic degeneration of the kidney which had finally resulted in haemorrhage from the renal vessels. No macroscopic obstruction of the ureter was found, and the bladder was apparently normal, as also was the uterus. A point of interest would appear to be the fact that with the kidney in what must have been an extremely precarious condition the sow was able to undergo the strain of delivering 15 pigs without provoking a fatal haemorrhage at that time.

I should welcome any information on the possible aetiology of this condition.

THE TREATMENT OF SCABIES

The Ministry of Health have issued a revised memorandum on scabies (Memo. 229) which replaces the instructions given in January, 1940. Where treatment can be carried out by a trained person the preparation of choice is now stated to be the 25 per cent. N.W.F. emulsion of benzyl benzoate. If treatment must be left to the patient, the Ministry advises the use of sulphur ointment two-thirds B.P. strength.

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Weekly Wisdom

"*. . . The benefactors of mankind are not the architects of cloud-cuckoo-lands in which a perfect organisation of society relieves the individual from the task of improving himself, but those who, understanding that the improvement of mankind depends on the improvement of the individual, have addressed themselves to men, not to Man, and have enforced their teachings by the example of their own lives.*"—H. K. *Punch.* September 2nd, 1942.

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ANNOTATION

Scabies

Scabies is and always has been a common disease ; commoner, probably, than is generally supposed. It is caused by the mite, *Sarcoptes scabiei* de Geer, and is referred to variously as "scabies," "the itch" or, in chronic cases, "the seven-year itch" and, amongst animals, as sarcoptic mange. A closely allied mite, *Notoëdres*, sometimes referred to as *Sarcoptes minor*, also occasionally affects humans but is principally a parasite of small animals such as cats and rodents. *Sarcoptes* and *Notoëdres* differ in certain morphological points but in other respects, such as life history and response to treatment, they are essentially similar. Of *Sarcoptes* it has been said that, "historically and geographically considered, this parasite is coextensive with the human race itself." Dr. Friedman's excellent monograph on scabies[6] provides much interesting information on the incidence of the disease in the past and up to and beyond the war of 1914-18. Thus the relative incidence of scabies in the U.S. army before, during, and after the Great War was 1·37, 8·38, and 6·51 per 1,000 respectively ; for the U.S. navy the corresponding incidence per 1,000 was 4·83, 4·96, and 5·64. He mentions, furthermore, that during the Great War the most frequently encountered skin disease in the U.S. army was scabies and that there were 34,619 cases of primary admission constituting 24·11 per cent. of all diseases of the skin and cellular tissues. In armies of other days scabies also seems to have been an all important problem, and in Friedman's chapter entitled "The Mite of Scabies *versus* the Might of Armies" we read that "in the Napoleonic wars the sufferers from the itch in the French armies were counted by the hundred thousand," and, whether it be fact or legend, the great Napoleon himself suffered from scabies. In his Italian campaign (1796-97), as Sokoloff relates, "Whole regiments of soldiers, the moment they were encamped for the night, threw off their knapsacks and scratched *en masse*. The officers suffered no less than the soldiers ; their commander-in-chief was no exception, scratching himself with a vengeance until blood appeared."

It seems evident, judging from the number of cases which have been reported from several parts of this country, that scabies is increasing amongst civilians and soldiers. From data available in respect of patients admitted to infectious diseases hospitals in five English cities during the past ten years Mellanby[10] considers that, from 1931 to 1937, the incidence of scabies was low and fairly regular in distribution. In 1938, however, it began to rise, and since then this rise has accelerated. Although the incidence varied in the five hospitals the upward trend was the same in them all. Prior to 1938 the incidence was 3 per 1,000 patients ; by 1941 it had risen to 25 per 1,000. Many school medical officers drew attention, in their 1938 reports, to the increase in scabies. The start of the epidemic can therefore be dated and, while war conditions have probably aided the spread of the disease, they cannot be held wholly responsible. Carter[4] also draws attention to the pre-war increase in the incidence of the disease, which has now become a war-time problem, and Mackenzie[9], who cites other authors, not only mentions the increased incidence in human scabies but emphasises the importance of the fact that, at the present time, there is need of sustained national effort. He points out that, in many cases, the disturbed or even prolonged loss of sleep due to the almost intolerable pruritus cannot fail to have a deleterious effect on the workers' capacity, the soldiers' efficiency, and the morale of civilians and soldiers alike. In a recent Ministry of Health publication[12] one reads that "From the end of the last war until about 1936, scabies was gradually disappearing in this country. Since 1936, for reasons not yet known, scabies has been steadily increasing and, since the beginning of the present war, it has again become widely prevalent."

Sarcoptes is an obligatory parasite occurring in addition to man on a number of different domestic and wild mammals. It has been recorded from the horse, ox, sheep, goat, pig, dog, camel, llama, wolf, polecat, ferret, fox, lion, capybara, coatimundi, hartebeest, kudu, guinea-pig, and rabbit, although, in the case of wild animals, generally from individuals kept in captivity. No species of *Sarcoptes* occurs on birds. Warburton[19] summarised our knowledge of the work on this mite by earlier authors who had described and figured points of difference between the mites from different species of host. It is now held, as Buxton[3] points out, that the recorded differences were due to imperfect microscopes and technique, and that the anatomical characters are variable. Most authorities are now agreed that the varieties of the mite which have been described from domestic and other animals can be considered only as races of *S. scabiei*. Hirst[8] mentions having examined specimens from man and from 14 different species of domestic and wild mammals without being able to find a constant morphological character by which they could be

satisfactorily distinguished from one another. Buxton[2] also found he could not invariably separate the sarcopt of the horse from that of man on morphological grounds although certain minute differences, which were not constant, did exist between the two forms. Since these mange mites are inseparable by anatomical characters it is preferable that they be regarded as consisting of biological races associated with particular hosts. Their host specificity, however, is not absolute since it has been found possible to transmit the mites from various species of hosts to others. Thus Hirst[8] mentions that human beings may become infested, chiefly on the arms, chest, and neck, with the *Sarcoptes* of cattle producing a complaint known as "dairyman's itch," and with that of dogs, pigs, goats, camels, and horses. Buxton[2] notes that, although man generally derives his *Sarcoptes* from other human beings, there are many records of his infection having been clearly traced from animals; and he points out that the disease is, to some extent, an occupational one amongst those "whose pleasure or profession it is to breed dogs, nurse cats, milk cows, groom horses, tame lions, box with kangaroos, or tend llamas." Hirst[8] records the transmission of the sarcopt of one kind of animal to another, *viz.*, from sheep to goat, from goat to horse, sheep, ox, and pig, from camel to horse and from rabbit to guinea-pig and ferret. From information such as this it could be argued that the parasites "might be considered as host varieties in process of evolution, but still able to pass from one species to another. This point is one of great practical importance in connection with control measures, since sarcoptic mange is a scheduled disease in most countries." [Mönnig[13]].

As the external anatomy of the mite is familiar to veterinarians it would be superfluous to detail it here. The life-cycle of the parasite is, however, still imperfectly known, partly because it is extremely difficult to follow, for the mites are very small (female about 0·390 mm., male 0·225 mm. long) and delicate, and much of the cycle is passed under the skin surface of the host, and partly because there are many conflicting statements in spite of excellent studies made by earlier workers regarding the biology of the mite in current literature. It is to the careful and painstaking research by Munro[14], especially his observations regarding the length of the cycle, that we owe the best account of the life history. The adult female mite lives in irregular burrows from about 5 to 15 mm. or more in length which she excavates in the deeper part of the horny layer of the epidermis and rarely reaching as deep as the granular layer. Munro observed that, when forcibly removed from her gallery, she is able to start a fresh burrow and bury herself completely in human skin in a very short period. Friedman[6], quoting Munson, says that "experiments have shown that the impregnated female will bore its way into the epidermis within 30 to 60 minutes after being placed on the skin surface." Although it cannot be proved that a regional cutaneous immunity exists it does seem that, as is indicated by the fact that the mite characteristically has a predilection for certain sites, a regional susceptibility to scabies is definitely present. This preference may, however, be readily explained by the differences in texture and thickness of the skin in various parts of the body where the corneous layer is much thinner and therefore more readily penetrable by the mite. Generally, in humans, the mite chooses some part of the body where the skin is thin and soft or folded, such as the webs and lateral aspects of the fingers and toes, the flexor surfaces of the wrists, the anterior axillary folds, the region of the nipples in the female, and the glans and shaft of the penis. Other areas, thicker skinned, such as the exterior surfaces of the elbows, the buttocks, knees, and ankles, etc., may be attacked and, in fact, infestation may occur on almost any part of the body. Amongst the lower animals, although all parts of the body may become affected in unchecked infestations, the mite prefers to attack those parts of the body not covered by much hair. In humans the burrow appears as a fine, raised, more or less tortuous line, typically grey or dark in white-skinned people, because its rough upper surface catches dirt and because of the mite's faeces within it. The burrow is difficult to detect in a brown skin.

The external temperature exercises considerable influence on the activity and development of the mite. Thus, once the mite has penetrated beneath the skin it continues excavating its gallery only if the skin is warm, as when a person is in a warm room or in bed. In experimental infections Munro was able to regulate the rate of burrowing by alternately holding the hand over a radiator and then cooling it. The itching, probably the most noticeable symptom, is not produced by the presence of the mite in the skin but by its activity in extending the gallery, and, under normal conditions, the burrowing period corresponds more or less to the time spent in bed, roughly eight hours. The average length of a burrow excavated daily is about 2 to 3 mm. and it is assumed that the mites feed on the liquid from crushed epidermal cells.

As she burrows into the skin the female deposits her eggs. These measure about 150μ by 100μ. The first egg may be laid within 24 hours of the time the female reaches maturity, and it is considered probable that she lays rather more than two eggs daily up to a total of 40 to 50. The eggs, probably depending on the temperature of the skin surface, may hatch in about 65 hours but may take as long as 100 hours or even longer. From the egg there emerges an active hexapod larva which moults to produce an octopod nymph. According to some authors this first nymph moults to produce a second nymphal stage which, after a further moult, gives rise to adult mites. Others consider that the nymph moults to produce either an adult male or an immature, pubescent female which moults once more to produce an adult, ovigerous female. Although pairing has not been accurately observed the view generally held is that the male mates with the pubescent, but not with the ovigerous, female. The opinion, however, has been expressed that it is the ovigerous female which mates, fertilisation being accomplished through an opening on a minute papilla present on the dorsal surface of the abdomen and absent in the pubescent female [Buxton[1]].

According to Munro[14] the length of the various stages expressed in days is as follows: egg, 2·5 or more; larva, 1·5 to 3; nymph, 1·5 to 2·5; pubescent female, 2·4. Thus, from the time of deposition of the egg until the appearance of the ovigerous female, only seven and a half days need elapse at shortest. It is believed that the lifetime of the adult male and ovigerous female is four to five weeks.

After hatching from the egg the larva leaves the gallery made by the female and makes its own tunnel. This can be distinguished by minute vesicles beneath its floor. The nymph probably also makes its own tunnel. Although it is uncertain whether the males and pubescent females migrate to excavate their own tunnels or remain in the nymphal burrow there is reason for believing that the ovigerous female does not normally migrate.

The question of the ability of the mite to live apart from its host is a very important one and, unfortunately, there is a dearth of reliable data on this subject. The larvae, and probably all other stages, are sensitive to dryness, so that it may be supposed that there is a high rate of mortality amongst mites wandering on the skin or clothing of the host. Gerlach found that, exposed in the dry, warm air of a room, the mites became very inactive within 24 hours, that after two days they showed only slight movement, and that after three or four days they could not be revived by moisture and warming. Even if humidity is high no stage of the mite, it is believed, is able to survive unfed for longer than a relatively few days. Munro[14] mentions that the isolated larva, if kept moist, does not survive for more than 30 hours. In experiments carried out with infected garments Munro thought it probable that 11 days do not represent the limit of the infectivity of mite-contaminated clothing. Gerlach, previously, had estimated that bedding containing acarine ova may be infective for 14 days.

Buxton[2] mentions that no information exists as to the upper temperature that is fatal for various periods of exposure, that disinfection of blankets, etc., by heat is based, at present, on faith alone, and that probably the temperatures used are needlessly high. In this connection Friedman notes that Munro's experiments indicate that mites would not survive laundering in the ordinary steam laundry washer. In fact, Friedman doubts whether they would even survive the ordinary non-boiling laundering process to which linens are subjected in the average home, although, in the interest of more certain prophylaxis in civil life, he suggests that at least two weeks be permitted to elapse after laundering before again using previously mite-contaminated linens, or after blankets or clothing have been dry-cleaned, hot-ironed, etc.

Amongst humans, *Sarcoptes* is notorious for its lack of respect for person, age, sex, or race. "Whether it be in the epidermis of an emperor or a slave, a centenarian or a nursling, it makes itself perfectly at home with undiscriminating impudence and equal obnoxiousness." Although cases of apparent immunity to the disease are occasionally reported in the literature it may, according to Friedman, be set down "as well-nigh incontrovertible fact that there is no absolute immunity to scabies. Nor does having had the disease confer immunity, for, under favourable conditions, it can be recontracted again and again." Culbertson[5] also notes that no immune response to scabies has yet been demonstrated. Asymptomatic scabies carriers, however, may occur who are capable of transmitting the disease to others. Scabies occurs more frequently in men than in women, and about equally in the sexes in children, according to Friedman; and, from statistics which he quotes, it appears that it shows a definite seasonal incidence. It is more prevalent in autumn and winter than in the spring and summer, being least prevalent during the summer months. These seasonal changes are probably due rather to the effect of climate on human beings than on the mites, since the former, in cold weather, crowd together, change and wash underwear and linen less frequently, and have fewer opportunities for bathing. Reports on the incidence of scabies indicate that it is much more common in the yellow and black races than in the white.

It has been observed, in humans, that a period of eight to ten days

usually intervenes between the time of infestation and the development of symptoms, although this period may be much longer in those who have been classed as "scabies refractory."

Clinically, one may distinguish simple scabies, producing symptoms of irritation due to the burrowing of the mite, and complicated scabies, producing symptoms aggravated by septic complications like impetigo and dermatitis as the result of the unwise use of sulphur medicaments. Another well-defined condition is "crusted scabies" in which thick crusts, stratified and projecting 2 to 3 mm. above the skin surface, and callosities are found on various parts of the body, particularly the limbs. The condition, which generally requires at least a year for its development, was originally described among lepers in Norway, and, despite the fact that, as Buxton[3] points out, the disease has been recorded from most European countries, from Turkey, and from several tropical countries including Brazil, French Guinea, Melanesia, and Java, is sometimes referred to as "Norwegian crusted scabies." Most authors are agreed that the condition is rare and that isolated cases occur only from time to time. Enormous numbers of mites in all stages of development live in the crusts, although they are perfectly capable of burrowing in the normal way, and the accumulation of dead epithelium and dried exudate makes the condition very similar to sarcoptic mange of the horse. Diverse views are held as to the epidemiology of crusted scabies. Some regard it as ordinary itch occurring in an insensitive or neglected individual; others believe that the mites in crusted scabies are derived from animals and are completely different from those in the ordinary disease. Both views are supported by evidence. A third possible view that the disease is peculiar to man but essentially different from common scabies is, as Buxton[3] points out, owing to its rarity and its tendency to appear as single cases, not tenable.

It has been noted above that host specificity is not absolute and that mites have been transmitted from one kind of host to another. In this respect the severity of scabies acquired by man from animals differs considerably with circumstances, and sometimes the irritation is felt within a matter of hours after the mites have reached the skin. Buxton[3] notes that "mites derived from the camel appear to be particularly irritating" and continues, "it is said that Roberts' famous march from Kabul to Kandahar in 1880 almost broke down owing to sarcoptic mange in the camels and in those who looked after them." At the same time the opinion is held that the biological races of the sarcopt which are proper to animals are unable to establish themselves on man and that, in many cases, they make no complete burrows. Also, humans infected from animals are apparently not a source of danger to other persons, but to what extent humans with *Sarcoptes scabiei* var. *hominis* are a source of infection to domestic animals is not known. Friedman[6] points out that "*Sarcoptes scabiei* var. *equi*, as well as other varieties of the species sarcoptes parasitic on mammals, do not tend long to perpetuate themselves on abnormal hosts, such as humans. If and when such perpetuation does occur, it is usually because of repeated contact with and reinfestation from the primary source of the disease, *i.e.*, the infected animals." So far as human infection is concerned, recent researches indicate that direct personal contact with an infected person is the chief factor responsible for the spread of the disease; while the part played in its transmission by clothing, bedding, towels, etc., is not yet clear and requires further investigation [Mellanby[11]].

Treatment of Scabies

It has been said that "A disease with many remedies has no cure," and this has come to be generally recognised as a truism. Scabies will soon come to merit a place in the category, for "of cures for scabies there seems to be no end." But, while few skin conditions lend themselves as easily and quickly to cure as does this disease, its successful treatment is not altogether a simple matter, and the details in the ritual of treatment are numerous. In addition each is of such importance that, unless it is properly carried out, failure is almost sure to result. Folk-lore on scabies is full of quaint and complicated rituals and it would be difficult to find one more intricate—and futile—than the following mentioned by Rolleston[17] as being used at Cavan: "Get a black cat without a single white hair; a left-handed man is to whirl it round his head three times. With the charred remains of nine barley corns mix nine drops of blood from the cat's tail. Apply the ointment thus made with a gold wedding ring, walking round the patient three times invoking the name of the Trinity." Medical and veterinary literature on the treatment of scabies contains references to a large number of drugs which have been used from time to time. This literature has been reviewed in an excellent manner both by Friedman[6] in his monograph, and by Gordon and Seaton[7]. Much of the following information has been culled from the writings of these authors.

Although numerous remedies and methods of treatment have been used in the therapy of scabies the majority of these have fallen into disuse because they were inefficient in killing the mites or because they produced irritant effects on the human skin. If one disregards these medicaments of doubtful value there are left three classes of substances in popular use to-day: (1) preparations containing free or combined sulphur, (2) preparations containing rotenone, and (3) preparations containing benzyl benzoate. It appears that all three kinds of preparations are effective in curing a high proportion of cases when properly used but opinions differ as to which is the best.

Knowledge of the scabicidal value of sulphur goes back many hundreds of years. From Friedman[6] we learn that "In his *De re medicina*, Celsus, about 25 A.D., recommended a mixture of sulphur and pitch for the cure of scabies in humans as well as in animals." There is little doubt that sulphur to-day, as it has been for centuries, is universally regarded as a specific, if not *the* specific, remedy in the treatment of scabies; nevertheless, although, when it is correctly applied, its efficacy is amply proved, it cannot be considered an ideal remedy. Various explanations have been put forward as to the acaricidal action of sulphur. Some contend that sulphur ointment by suffocating the mite through depriving it of air acts mechanically. Others believe that the element acts chemically by the generation of sulphur dioxide or hydrogen sulphide gas which suffocates the acari. Still others believe that the lethal action is due to the formation of pentathionic acid.

The commonest form of sulphur treatment prescribed is sulphur ointment. The British Pharmacopoeia preparation contains 10 per cent. of sulphur and a 5 per cent. preparation is used for children. The principal objections to its use are that it must be applied on at least three successive days with due regard to the necessary details of the treatment, that it is messy and damaging to clothes, and that it may produce a sulphur dermatitis as bad as the disease. Various modifications of sulphur ointment were used during the latter part of the eighteenth and throughout the nineteenth centuries and Friedman lists 13 of the most popular ones as well as some currently popular ointment formulae.

In an endeavour to reduce the number of applications necessary various rapid-cure methods were introduced, the two most noteworthy being "The Danish Treatment of Scabies" and "The Oppenheim Rapid-cure Method." Opinions vary as to the efficacy of the former treatment, many pronouncing it to be highly successful; its greatest disadvantage appears to be the tendency for a sulphur dermatitis to supervene. A few authors categorically advise against using this treatment. Oppenheim's treatment lasts three hours, but has been criticised as not always effecting a cure and as being too drastic to be repeated.

Another method of applying sulphur to scabietic patients consists in sponging or painting the surface of the body with a solution of sodium thiosulphate, allowing it to dry, and then applying hydrochloric acid. Varying percentages have been advocated for the "hypo" and hydrochloric acid solutions ranging from 25 to 40 per cent. for the former and from 2·5 to 5 per cent. for the latter. In this method of treatment a chemical reaction occurs with the liberation of sulphur dioxide and the precipitation of fine grains of nascent, colloidal sulphur. This treatment has the advantages over the ointment therapy of cleanliness and of reduced risk of dermatitis, since less sulphur is applied to the skin; it requires no special skill and is convenient where bathing facilities are difficult; but it requires to be repeated two or three times to ensure a cure. The "Hypo-HCl" method has been used in veterinary medicine with varying degrees of success.

Gordon and Seaton[7] mention that "Dimethyl diphenylene disulphide, or dimethylthianthrene, was introduced in 1921 under the name of 'mitigal' (Bayer) for human scabies, and, with 40 per cent. isoheptyl acetate, as 'odylen' for veterinary use." It is an oily synthetic organic compound containing about 25 per cent. chemically bound sulphur and, while relatively expensive, it is free from most of the usual disadvantages of the ordinary sulphur therapy of scabies. Most authors stress the absence of dermatitis as a result of mitigal therapy although experience has shown that dermatitis sometimes does occur.

Derris and its extracts have also been used in scabies therapy and, although some of them note that rotenone dermatitis may be produced, many authors have reported successful results.

Benzyl benzoate ranks high in popular favour as a cure for scabies at the present and that it is becoming increasingly popular is attested by many favourable reports which have recently appeared in the literature. So far it has been used only for human scabies. That it has not been used against animal mange is probably due to its relatively high cost. Those who have used it say that it is efficient, non-irritating, devoid of toxicity, does not stain clothes, although it does seem that dermatitis may occur in a few instances.

Gordon and Seaton[7] tested the effect of tetraethylthiuram monosulphide on *Notoedres* infections of Syrian hamsters, albino rats, and

guinea-pigs, and, when compared with benzyl benzoate and dimethylthianthrene (mitigal), it was found to be the most lethal for the mites and their eggs and the most rapid in action. The vehicle used for all the drugs tested was the methyl ester of the fatty acids of coconut oil. This allowed the drugs to reach at least 90 per cent. of mites and eggs after a single application. They have no evidence of the extent to which tetraethylthiuram monosulphide may cause dermatitis but they feel that their findings justify the trial of the compound in human scabies.

J. N. OLDHAM.

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ABSTRACTS

[THE TREATMENT OF SCABIES. MELLANBY, K., JOHNSON, C. G., and BARTLEY, W. C. (1942.) *Brit. med. J.* No. 4252. (July 4th.) 1-4.]

The authors tabulate and discuss the results of treatment of some 1,500 cases of human scabies, in which all the medicaments in use and having claims to efficiency were employed in turn, each on a number of cases, and the results assessed by collection of the parasites from the patient by a technique claimed to recover 90 per cent. of the parasites present. (Technique not disclosed.)

In sum, our old friend sulphur came out well in the form of ointment (10 per cent.), better still prepared according to the formula of Marcussen, but in other forms was unreliable, including the nascent form produced by the interaction of sodium thiosulphate with hydrochloric acid ("even after three applications a substantial proportion of the parasites remain alive").

Derris, and rotenone preparations, pyrethrum, betanapthol, and lethane proved unsatisfactory.

Dimethylthianthrene (mitigal) was highly efficient but expensive, and recently all but unobtainable.

Benzyl benzoate, the active ingredient of balsam of Peru, was on every count the best of all the remedies tried. The authors recommend the following formula, which seems worthy of trial upon animals.

1.	Benzyl benzoate ...	200 mils.
2.	Stearic acid ...	20 g.
3.	Triethanolamine ...	5 mils.
4.	Water to produce...	1,000 mils.

Melt 1 and 2 in water bath. Mix 3 with half of 4 warmed, and pour into 1 and 2 already mixed when they have cooled to 30° C. Emulsify by shaking and add the balance of water.

R. C. G. H.

[SURGERY OF THE ANAL SACS. THEOBALD, A. R. (1942. *N. Amer. Vet.* **23**. 44-46. (3 photographs and 1 diagram.]

Removal of the anal sacs in the dog is frequently indicated but their small size and thin wall may render the operation difficult. The following technique is designed to facilitate the procedure.

The patient is fasted and the colon emptied by means of an enema. General anaesthesia is produced and the patient is secured on the sternum with the hindquarters somewhat elevated. The site is clipped and cleansed and the sacs are expressed and washed out. A special instrument consisting of a cannula fitted with a blunt and notch-ended probe (instrument diagram is given) is used to pack the sacs with coloured cotton warp. The distended sacs are easily felt and a vertical incision is made over each in turn. The packing facilitates dissection and the cotton quickly reveals any accidental puncture. No suturing is required and healing is rapid.

J. W. H. H.

REPORT

[ORISSA. Report of the Civil Veterinary Department, 1940-41.]

The annual report of the Civil Veterinary Department, Orissa, for the year 1940-41 is the fifth report since Orissa was separated from Bihar, and it is encouraging to note that the development of a comprehensive animal husbandry department has been continued along the lines laid down when the present department was formed in 1936. A great increase has taken place in the activities of that department, though there has up to the present been no great increase in the qualified veterinary staff. The number of Orissa students at veterinary colleges has, however, steadily increased and a number of stockmen have recently been trained at veterinary hospitals and are now employed to assist the veterinary staff in carrying out inoculations and similar work.

During the year under review cattle diseases, particularly rinderpest and foot-and-mouth disease, were very prevalent all over the province and the number of cattle protected against contagious disease was still further increased. In particular, much greater use has been made of the goat tissue virus method of active protection against rinderpest and the results are reported to have been very satisfactory.

There was no addition to the number of hospitals and stationary dispensaries but there has been a very considerable increase in the amount of work carried out by veterinary assistant surgeons on tour and this valuable service is now supplemented by the work of veterinary stockmen.

There has been a marked extension, since 1935, of the measures adopted to encourage the breeding of improved stock and still further breeding centres were opened during the year. An interesting feature of the breeding operations is the development of cattle shows, 23 of which were organised in different parts of the province during the year, whereas in 1935 no show of this kind was held. Elsewhere in India such shows have proved of great value in encouraging the systematic care and development of improved stock, and it is of interest that a grant was made, during the year, to the All India show which was organised in 1938 to serve as a central show at which the best stock from such provincial shows could compete with those from other provinces.

In addition to stimulating interest in the comparative merits of their stock, by owners, these shows serve as valuable centres for propaganda and the demonstration of silage making, the preservation of manure, and other measures which need constant attention if land fertility and the quality of stock is to be improved.

As an indication of the trend of development it is significant that a separate section in the report is now given to livestock industries such as trade in live animals, hides and skins, wool and mutton, and egg production.

When the separate department for Orissa was formed in 1936 the investigation of disease was dealt with by the investigation officer for Bihar and Orissa, but this arrangement was found to be inadequate. An investigation officer for Orissa has since been appointed and is now continuously employed in the investigation of disease in the villages of Orissa alone. An important finding was made that Johne's disease is very prevalent in the dairy herd at Cuttack and sporadic throughout the province. This is in accordance with the finding that this disease appears to spread rapidly in Assam, where the climatic conditions of extreme humidity are very similar to those of Orissa; whereas at Mukteswar the disease tended to die out in the experimental Johne's disease herd which was maintained there over a period of ten years.

A. O.

QUESTIONS IN PARLIAMENT

Milk Production

Brigadier-General Clifton Brown asked the Minister of Agriculture whether he is aware of the anxiety felt as to the possibility that this year's record summer milk production has been obtained at the cost of winter milk; and whether he has any statement to make?

Mr. Hudson: Yes, Sir, but I am glad to say that this suggestion seems to be ill-founded. The increased milk production this summer has been obtained from some 50,000 fewer cows in milk than there were during the corresponding period last year. On the other hand the returns now available indicate a notable increase in the number of cows and heifers due to calve this autumn. This is welcome evidence that many dairy farmers have, in response to the Government's wishes, made preparations for increased winter milk production.

. . . . .

Milk (Pasteurisation)

Mr. David Adams asked the Parliamentary Secretary to the Ministry of Food what progress has been made towards the elimination of disease organisms from milk for human consumption, by pasteurisation or other methods?

Mr. Mabane: Very considerable progress has been made in the direction suggested by my hon. Friend. As my hon. Friend is aware there is close collaboration in this matter between my Noble Friend and my right hon. Friends the Ministers of Agriculture and Fisheries and of Health. The inspection of dairy herds, milk sampling, the tuberculosis order, the tuberculosis attested herds scheme, and the new scheme for the control of diseases of dairy cattle, all play their part under the direction of the Minister of Agriculture and Fisheries. Pasteurisation standards are set by the Minister of Health and action is taken by the appropriate officers under the Act and regulations relating to food generally and to milk in particular. At the present time the responsibility for distribution of milk rests upon the Minister of Food, and I am able to say that at present it is estimated that some 70 per cent. of the milk supply is pasteurised before distribution to consumers. It is anticipated that the rationalisation of wholesale and retail distribution now being undertaken will result in a larger proportion of supply being pasteurised.

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Scabies

Mr. Evelyn Walkden asked the Minister of Health whether, since the issue of the White Paper, he has given further consideration to the question of making scabies notifiable in view of the opinion of many local local authorities that this course would be of material help to them?

The Minister of Health (Mr. Ernest Brown): I have considered this question, and, while I am advised that it would not be appropriate to make scabies notifiable generally, I am prepared to consider applications from local authorities to have scabies made notifiable in their district, upon being satisfied that the authority has adequate facilities for diagnosis and treatment.

Soil erosion is not a terrifying picture drawn by theorists. It is a practical reality throughout the world. The United States have lost a third of their soil, and over large areas the desert is making successful advances. The Nazi domination of Europe probably contributes to the problem, if the "scorched earth" policy was faithfully carried out and livestock either removed or destroyed. The living organisms in the soil unless given the conditions for survival die out, leaving only the mineral framework, an inert medium, the "dust-bowls" of America. To maintain the living population in the soil the most satisfactory practical aid is to have mixed farming, in which there is a happy blend of livestock and cropping.—*Scottish Farmer.*

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Speaking at a meeting of Cumberland F.U., Mr. Charles Roberts said it seemed clear that the hill sheep subsidy for next year would be confined to breeders of pure-bred hill lambs. Mr. Muirhead strongly urged the claims of the crossbred sheep breeders, and a committee was appointed to work out their case.

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An all-round drop in the live stock population of Eire during the past year is reported. Cattle have declined from 4,150,500 to 4,093,100; sheep from 2,909,400 to 2,685,400; pigs from 763,700 to 513,800. Poultry, however, have increased from 17,392,800 to 17,653,700.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Sept. 30th.—Meeting of West of Scotland Division, N.V.M.A., at Glasgow, 2.45 p.m.

Oct. 1st.—Annual Meeting of the Central Veterinary Society, Conway Hall, Red Lion Square, W.C.1, 2.45 p.m.

Oct. 7th.—Meeting of the Scottish Metropolitan Division, N.V.M.A., at Edinburgh, 10.45 a.m.

Oct. 9th.—Meeting of the Lancashire Division, N.V.M.A., at Manchester, 2.15 p.m.

Oct. 13th.—R.C.V.S. Council and Committee Meetings, Royal Station Hotel, York.

Oct. 14th.—R.C.V.S. Council and Committee Meetings, Royal Station Hotel, York.

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The Scheme for the Control of the Diseases of Dairy Stock in Scotland

The above scheme will begin on October 1st. Veterinary practitioners and others who wish to obtain forms setting out the advices concerning treatment, etc., and the conditions of the undertaking, should write to the Ministry of Agriculture, Scottish Branch, 15, Moray Place, Edinburgh, 3.

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R.C.V.S. OBITUARY

Burchnall, John Joseph, Hill Top, Barrow-on-Soar, near Loughborough, Leics. Graduated London, April 1st, 1878. Died September 15th, 1942; aged 89 years.

Hannan, Henry, Cowper Gardens, Rathmines, Dublin. Graduated N. Edinburgh, April 24th, 1878. Died September 11th, 1942.

Reynolds, Harry Sharman, Daventry, Northants. Graduated London, December 13th, 1894. Died August 14th, 1942; aged 69 years.

Secker, Bertrand Lewis, 35, Maple Road, Sutton Coldfield, Warwicks. Graduated London, December 16th, 1890. Died September 17th, 1942; aged 73 years.

Mr. H. Sharman Reynolds, M.R.C.V.S.

We record above with much regret the death of Mr. Harry Sharman Reynolds, senior partner in the firm of Reynolds & Hughes, of Daventry, which took place suddenly, after a period of failing health. Mr. Reynolds, who was well known over a wide area, had practised in Daventry for the last 50 years, and his father also held the practice for 25 years.

A prominent freemason and a keen sportsman, Mr. Reynolds's chief interest lay in horses, and in his younger years he was a well-known figure riding with the Pytchley Hunt. Some time before his death he held the chairmanship of the local Conservative Club. He leaves a widow, a son and a daughter, to whom deep sympathy is extended.

Masonic rights were carried out at the graveside after a funeral service at Daventry Parish Church, which was conducted by the Rector, Canon J. F. Winter, the attendance including a large number of farmers. Amongst the immediate mourners were Mr. E. Brayley Reynolds, M.R.C.V.S., of Newmarket, and Mr. Alun P. Hughes, M.R.C.V.S., partner to the late Mr. Reynolds.

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GENERAL OBITUARY

Mr. A. E. Emerick

We regret to announce the death of Mr. A. E. Emerick, of the firm of Messrs. Arnold & Son. He had been ill for only a short time and was a patient in St. Bartholomew's Hospital. A member of our profession writes of him: "Mr. Emerick was well known to veterinary surgeons and there were many who were proud to call him friend. He had spent almost his whole life in the veterinary instrument business and in the service of Messrs. Arnold. He seemed to know everyone in the profession: he could give their initials, address and recite their whims and fancies with reference to instruments without recourse to any book. His advice was particularly valuable to those who had some new surgical instrument in mind. He had the gift of being able to put into practical form the visions of the enthusiastic inventor. Emerick was a quiet unassuming man, a kind man with a happy laugh, a man who, although he had been through much sorrow, made the best of life. He will be missed sadly by his many veterinary friends."

NEW SECRETARY OF THE ZOOLOGICAL SOCIETY

Dr. Sheffield A. Neave, Assistant Director of the Imperial Institute of Entomology, was elected Hon. Secretary of the Zoological Society of London at a recent meeting of the Council of the Society, to fill the vacancy caused by the resignation of Dr. Julian Huxley. Dr. Neave will hold the office until April, 1943, when the next annual general meeting will be held.

Dr. Neave edited the *Nomenclator Zoologicus*, an index of the names of genera and sub-genera in zoology. It contains 225,000 names, some 5,000 of which are not to be found in any similar work.

He is 63, and has been Honorary Secretary and President of the Royal Entomological Society of London. He went as naturalist on the geodetic survey of Northern Rhodesia in 1904-5; and was entomologist to the Katanga Sleeping Sickness Commission in 1906-8 and to the Entomological Research Committee (Tropical Africa) in 1909-13.

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SCHEME FOR THE CONTROL OF DISEASES OF DAIRY CATTLE

STATEMENT SHOWING THE NUMBER OF UNDERTAKINGS NOTIFIED TO THE MINISTRY OF AGRICULTURE DURING THE WEEK ENDED SEPTEMBER 19TH, 1942

County	Undertakings Notified		Total Undertakings		
	During Week	Previously	Number	Number of Cattle: Cows	Number of Cattle: Heifers
ENGLAND					
Bedford	1	23	24	637	426
Berks	—	34	34	1,127	758
Bucks	—	27	27	720	530
Cambridge	—	9	9	185	92
Chester	9	198	207	7,370	2,480
Cornwall	—	—	—	—	—
Cumberland	—	20	20	623	574
Derby	3	90	93	2,822	1,747
Devon	1	72	73	1,267	817
Dorset	—	25	25	824	550
Durham	7	120	127	2,980	776
Essex	6	107	113	4,857	2,815
Gloucester	3	41	44	1,527	861
Hampshire	4	150	154	4,900	3,057
Hereford	1	12	13	228	111
Hertford	2	36	38	1,240	811
Hunts	1	4	5	148	92
Isle of Ely	—	1	1	1	8
Isle of Wight	—	4	4	55	15
Kent	1	58	59	1,219	751
Lancs.	5	88	93	2,807	805
Leics	3	31	34	952	631
Lincs (Holland)	—	4	4	45	11
Lincs (Kesteven)	1	8	9	99	64
Lincs (Lindsay)	1	28	29	556	224
Middlesex	2	2	4	220	78
Norfolk	6	104	110	3,246	2,132
Northants	3	34	37	1,043	873
Northumberland	1	37	38	1,225	608
Notts	6	38	44	1,125	575
Oxford	1	16	17	448	559
Rutland	—	6	6	110	68
Salop	9	126	135	4,377	2,057
Soke of Peterborough	—	—	—	—	—
Somerset	1	67	68	1,837	746
Staffs	1	94	95	2,871	1,412
Suffolk, East	3	39	42	1,030	721
Suffolk, West	1	22	23	451	301
Surrey	—	56	56	1,567	696
Sussex, East	3	83	86	2,286	1,159
Sussex, West	2	57	59	1,751	1,112
Warwick	4	67	71	1,794	1,187
Westmorland	—	13	13	272	327
Wilts	1	33	34	1,567	794
Worcester	6	94	100	2,224	1,066
Yorks, E.R.	2	27	29	555	277
Yorks, N.R.	—	57	57	1,218	669
Yorks, W.R.	4	121	125	3,316	1,151
WALES					
Anglesey	—	10	10	191	64
Brecon	—	2	2	25	9
Caernarvon	—	77	77	1,385	659
Cardigan	—	12	12	170	119
Carmarthen	2	131	133	2,497	1,292
Denbigh	2	31	33	697	330
Flint	2	59	61	1,380	664
Glamorgan	3	41	44	707	263
Merioneth	—	7	7	81	72
Monmouth	2	15	17	459	265
Montgomery	—	4	4	132	118
Pembroke	—	57	57	1,138	716
Radnor	—	—	—	—	—
TOTALS	116	2,829	2,945	80,593	42,154

Note.—Of the total 2,945 undertakings notified to date 794 are for 1 year, 170 are for 2 years, and 1,981 are for 3 years.

SCIENCE AND FARMING

A committee has been formed under the chairmanship of Sir John Russell, F.R.S., to work with the Allied Technical Advisory Committee on scientific problems connnected with post-war agricultural reconstruction in devastated Europe. Another committee, with Dr. Dudley Stamp as Chairman, will consider the further application of science to rural planning, as suggested at the Conference on science and world order in 1941.

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MINISTRY OF AGRICULTURE NEWS SERVICE

Grass Silage

Quantities to Make a Herd Self-Supporting.—The West of Scotland Agricultural College demonstration in grass-silage making emphasised the following points:—

The aim of every dairy farmer should be to produce at least 50 cwt. of grass silage per cow.

A herd of 40 cows would require 100 tons of grass silage for use in replacing concentrated feeding from the beginning of December until May. On the college farm 25 acres of first year ley produced 128 tons of grass.

Feeding trials with bullocks showed that stock could be fattened satisfactorily without concentrates on home-grown food including grass silage.

Dairy-cow trials tested the feeding of stock with 16 lb. of hay, 40 lb. of roots and 17½ lb. of grass silage per gallon of milk, against the same rations with the silage replaced by 3½ lb. of cencentrates. A switch over of the two groups of cattle from one ration to the other showed no difference in the milk yields.

As much as 80 lb. of silage a day was fed at the peak period to a cow giving 5 gallons of milk per day.

Silage Saves Ships and Money.—The cost of silage-making has been investigated by the University College of Wales. Information was obtained from fifty farmers, of whom only six had had pre-war experience of silage-making. Grass silage averaged £1 a ton and cereal silage 30/-.

Six tons of a really first quality silage will replace one ton of a balanced concentrate costing £14 a ton. Good silage is the firmest foundation for herd rations in winter. It saves ships as well as money.

Maximum Interest in Clamp and Pit Silage.—Silage-making demonstrations have shown that many farmers who used a container last year are planning to use a pit or clamp this season. At a recent demonstration on the farm of Mr. J. P. Brown, of Sulgrave, a pit 15 ft. x 4 ft. x 30 ft. was filled with rye and vetches. A reinforced paper container also was loaded with rye-grass and red clover mixture. No special equipment was used and the work was carried out by three men and a member of the Women's Land Army. The attendance at this demonstration was composed mainly of farmers cultivating small areas. Some of them had not made silage and the general opinion was that the work was not so onerous as it was sometimes made out to be.

At Thorpe Waterville, on Mr. C. E. Harvey's land, one year rye-grass-clover mixture, cut with a Cutlift, was ensiled in a pit of 350 tons capacity. On Messrs. Turney Bros.' farm at Quinton, rye-grass and clover taken from a short-term ley was ensiled in a clamp 15 feet wide, 2 feet deep and 60 feet long, having a capacity of about 100 tons for a 6 feet depth of settled silage.

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Potatoes for Cows

The necessity, under war-time conditions, of reserving grain for human consumption has led to investigating the possibility of substituting surplus potatoes for the grain normally used in winter rations for cattle. In a recent experiment raw potatoes sliced and dried in a sugar beet factory, were used as a substitute for cereals and cereal products (oats, maize, bran) in the dairy ration.

Introduced gradually it was found that dried potato slices could replace the whole of the starchy concentration, so that ultimately cows getting only cake and potatoes milked and maintained their health as well as those receiving the normal ration of cakes and cereals.

While the potatoes were being fed at the highest level tasting tests gave no indication of any difference in flavour.

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Chaff and Cavings.—The protein content of chaff and cavings seems generally to be higher than most people imagined. This may be largely due to undergrowth. When a corn crop undersown with "seeds," or even self-sown with grassy weeds, is well harvested the greenery retains its natural colour and its carotene much better than grass preserved as hay in the normal way.

Here, probably, we have the secret of the high protein and carotene figures and a pointer towards improved hay-making—air-drying under shade, or cocking for want of a better way.

CORRESPONDENCE

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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SCHEME FOR THE CONTROL OF DISEASES OF DAIRY CATTLE

Uterine Irrigation

Sir,—I was very glad to see Mr. L. G. Anderson "taking up the cudgels" with Mr. Smythe *re* uterine irrigation.

I myself have been consistently annoyed with Mr. Smythe's efforts to sabotage the Survey Scheme and heartily welcome Mr. Anderson's lead against this attitude.

I was present at a recent meeting of the South Western Division and I had the feeling that many members were ready to support the scheme. It is my belief that the decision to vote against the scheme was largely due to Mr. Smythe's able, if misguided, orations, ably assisted by Mr. Motton!

Mr. Smythe continually asserts that, as far as Cornwall is concerned at least, the scheme has nothing new to offer, and that it will be a dismal failure through raising vain hopes of 100 per cent. cures in the hearts of credulous farmers. My contention is that if the client has confidence in his practitioner it matters not one iota whether the latter is paid quarterly on a "flat-rate" basis, or whether he sends in his bill as and when he pleases. If he carries out his work conscientiously and efficiently his clients will appreciate his efforts to do them good, under either régime.

Possibly Mr. Smythe has, at heart, fears based on purely economic grounds, *i.e.*, he will not get as much for his services as he does at present; in that case I would suggest that he admits this openly and faces the fact that under the changed conditions of to-day the older selfish standards of *laissez-faire* can no longer hold sway.

Just a final note concerning uterine irrigation. Between September, 1939, and December, 1941, the average of successful results in cases I treated by this method was 65 per cent., and I have reason to believe that my average for 1942 will be considerably higher. I shall certainly continue uterine irrigation in spite of its discomforts and Mr. Smythe's entreaties to desist!

Yours faithfully,

G. S. Allen.

"Dermic,"
Old Chard Road,
Monkton,
Honiton,
Devon.

September 14th, 1942.

. . . . .

Sir,—There is nothing to prevent any practitioner participating in the above scheme in including removal of the placenta in his Form of Contract, if he so desires. If super-enthusiastic, he can go a step further and include dystokia, for this, if left uncorrected, will in the same way as placentae left to rot, guarantee permanent future sterility.

The scheme is excellent in conception, but in its existing form is not a paying proposition to the practitioner or the large herd owner, and in the absence of the exercise of control over those found to be incurable, a bigger wash-out than that ever given to the most chronic form of pyometra.

For this reason, right from the outset I have consistently urged State direction and control: the State paying the practitioner direct for animals treated (this on a sliding scale, when several with the same disease are treated at one and the same time in a herd), and introducing legislation which shall prohibit the exposure for sale in any public market, auction or fair, of those animals found to be incurable; compensating the owner with the sum which he might reasonably have expected had he been permitted to have sent them to such places. Still further, it must be made compulsory. It will prove futile to attempt to eradicate or control any disease if "over the garden wall" it is permitted to flourish.

The Animal Health Branch of the Ministry of Agriculture and Fisheries was established in order to direct and control all diseases pertaining to farm livestock. It is high time that it now insisted upon doing so, its Chief Veterinary Officer being in *supreme command of his personnel*, and responsible to one person only, namely, the Minister of Agriculture and Fisheries. Then, and only then, can we expect to see visions of success.

Yours faithfully,

J. F. D. Tutt.

"Rothiemurchus,"
St. Cross,
Winchester.

September 14th, 1942.

TREATMENT OF HUSK

Sir,—When the Ministry sent to the practitioners, a few months ago, a questionnaire regarding certain animal diseases, they also asked if we had any diseases which were troubling us, and in my reply I said that husk was one, but I was looking forward to reading Mr. Taylor's paper on it. It came on January 10th, 1942, and a little correspondence on the subject has appeared in your paper since.

In this district husk is practically the only parasitic disease which causes death to the host and it is the only one for which the farmer asks for professional attendance. The cause has been known for years and the treatment has been the intratracheal injections of chemicals, etc. We were always taught that worms were the cause of unthriftiness and the loss to the country of millions of pounds in animal flesh and that our task was to treat affected animals. A tremendous amount of research work has been done on parasites and new treatments come out each year, but this most important parasitic disease, husk, receives very little attention, and now we are told that intratracheal injections are useless. It is the best treatment we have for it and apparently the only treatment, but what we want is some research worker to give us a really good prescription for it.

A few years ago, I asked one of the drug travellers if his firm had anything good for husk and he strongly advocated a preparation of his firm's containing formalin and gallic acid. I ordered some, but gave only half the dose which the firm recommended. The result was as follows: I poisoned about £300 to £400 of stock and lost six good clients, only two of whm have returned to me. A few of the tracheas were sent to Dr. Hare, though there was no doubt whatever as to the cause of death, some animals dying within 48 hours of being injected with formalin and gallic acid.

I am now using the prescription from Wallis Hoare's *Materia Medica* (new edition: Dr. Greig) and I find it good. Nevertheless, I am not satisfied and I consider it a disgrace that we should be in this plight with a disease which has been known for generations and for which nothing has been done in the manner of treatment.

Carbon tetrachoride has been invented for certain parasites, and now phenothiazine, but nothing for husk, which is practically the only parasitic disease which I am called in to treat.

I hope that Weybridge will see to it that something is done to help us in the treatment of this disease.

Yours faithfully,

G. C. Lancaster.

Eastwick House,
Evesham,
Worcs.

September 10th, 1942.

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COPPER SULPHATE TOLERANCE OF SHEEP

Sir,—I was interested to read H. E. Bywater's report on copper sulphate tolerance of sheep, as it brings up one or two important points. I always understood that tapeworms were relatively non-pathogenic in sheep and cases have been noted where 500 *Moniezia* species have been found in a healthy thriving lamb.

After about 40 days in the intestine the worms begin to shed ripe proglottides and when this is complete after a further 20 days they die, leaving the host comparatively immune. This accounts for the small number of these worms found in adult sheep. Infection, therefore, dies out automatically after a few months.

A certain number of tapeworms are always passed after dosing with copper sulphate, and farmers naturally jump to the conclusion that these must be the worms responsible for the unthrifty condition of their lambs, whereas in fact the blame should go to the various species of round-worms—the blood-suckers—which are so small and pass out unnoticed in the faeces. After dosing with copper sulphate scouring stops immediately, due to the astringent properties it possesses.

No wonder, then, that farmers often point out that phenothiazine cannot be as efficient as copper sulphate as it does not cause expulsion of the tapeworms and does not immediately stop scouring, but surely the evidence of the many workers on this agent shows that it removes the harmful round-worms far more efficiently.

No doubt the commonest cause of complaint about phenothiazine arises from inadequate dosage, an efficient dose for lambs being 15-20 grammes, *i.e.*, four times the most commonly used dose, although I see that Dr. E. L. Taylor recommends 20-30 grammes.

I know of a case where, due to error, copper sulphate was administered to 30 lambs in a dose ten times greater than advised. All showed signs of pain, but only two of the weakest lambs died.

Yours faithfully,

G. F. Brown.

The Retreat,
Morpeth.

September 20th, 1942.